

## ABSTRACT OF THE DISCLOSURE

A method for deriving coefficients for a time domain equalizer function (24) as implemented by a digital signal processor (35) in a DSL modem (20) is disclosed. A 5 transmitting modem (10), such as at a central office, issues a pseudo-random training sequence that is received by the receiving modem (20). Correlation matrices are derived by the digital signal processor (35), from which sets of eigenvalues and eigenvectors are derived. A flatness constraint on the frequency response of the time domain equalizer is established, and included with a flatness scaling factor ( $\lambda$ ) into a minimization cost 10 function. One or more values of the flatness scaling factor ( $\lambda$ ), preferably between minimum and maximum eigenvalues, are evaluated in the cost function, to derive the optimum filter for the time-domain equalizer. The flatness constraint ensures that the time-domain equalizer is not subject to near null conditions and large variations in its frequency response.